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UNIVERSITY OF ALBERTA

THE RELATIONSHIP BETWEEN SPONTANEOUS COPING STRATEGIES AND PERCEIVED ANXIETY DURING CARDIAC CATHETERIZATION

BY

LAVERNA M. LARRIVEE ©

A THESIS SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND
RESEARCH IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF
MASTER OF NURSING

FACULTY OF NURSING

EDMONTON, ALBERTA
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THE UNDERSIGNED CERTIFY THEY HAVE READ, AND RECOMMEND TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH FOR ACCEPTANCE, A THESIS ENTITLED THE RELATIONSHIP BETWEEN SPONTANEOUS COPING STRATEGIES AND PERCEIVED ANXIETY DURING CARDIAC CATHETERIZATION, SUBMITTED BY LAVERNA M. LARRIVEE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF NURSING.

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ABSTRACT

Excessive anxiety increases the potential for complications in invasive medical procedures such as cardiac catheterization. Although attempts to minimize anxiety through coping skills training have been implemented, a consistent reduction in patient distress has not resulted. It is thought that patients' spontaneous or untrained coping efforts may influence their ability to effectively use trained coping skills. Unfortunately, little is known about how patients spontaneously cope, particularly in the clinical setting. As such, the purpose of this study was to identify spontaneous coping strategies used by patients undergoing cardiac catheterization and to examine the relationship between various coping strategies and anxiety throughout the procedure.

A data subset from the first 62 patients who participated in a larger study was used for analysis. Data consisted of patients' subjective ratings of anxiety, reported at six points during the cardiac catheterization procedure, and their recollection of the coping strategies which they had used at those times. As no scoring system was available by which to categorize the coping data, the Coping with Invasive Medical Procedures Scoring System was developed and utilized in this study. Using a correlational design, the relationships between coping strategies and anxiety were examined.

Fluctuations in coping were evident throughout the procedure. "Control" and "hoping" were associated with high anxiety at the first three points, as was "faith in staff" at the fifth. Coping strategies associated with low anxiety were "passive coping" at the first point and "positive reframing" at the fourth. With the exception of the fourth point, whenever a significant relationship between coping and anxiety was observed, it remained so when coping at that point was correlated with anxiety at the next. Patients who repeatedly changed coping strategies throughout the procedure experienced slightly less anxiety than those using a more consistent coping approach.

The results are discussed with regard to the methodology, scoring system, and implications for coping research, patient teaching, and future study.

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CHAPTER 1

INTRODUCTION

Invasive medical procedures refer to operative or diagnostic techniques which necessitate the penetration of tissue and/or the intrusion of a body orifice. These procedures include diagnostic techniques such as breast biopsy, gastrointestinal endoscopy, and cardiac catheterization; repetitive medical procedures such as burn debridement and peritoneal dialysis; and all types of surgery. Because of their invasive nature, associated risks, and potential to cause pain or discomfort, these procedures are frequently associated with varying degrees of patient distress.

When faced with an invasive medical procedure, patients appear to manage their distress by utilizing various natural or untrained coping strategies. However, little is known about how they cope or their actual success in doing so. Apart from three studies done during blood donation and dental procedures (Kaloupek, White & Wong, 1984; Kaloupek & Stoupakis, 1985; Wong & Kaloupek, 1986), spontaneous coping by patients in the clinical setting remains virtually unexplored.

Health care professionals have attempted to alleviate the discomfort associated with invasive medical procedures by teaching patients various methods of coping. Although some degree of success has been achieved, patient distress has not been consistently reduced. In this regard, it has been questioned how coping skills training interacts with spontaneous coping (Kaloupek, 1987). Teaching coping methods may enhance patients' spontaneous coping efforts, but it could also interfere with previously learned coping strategies. As such, implementing coping skills training, a costly and time-consuming process, may prove no more effective than patients' natural abilities.

The focus of this study is the spontaneous coping efforts made by patients as they undergo an invasive medical procedure. It is thought that an increased understanding of how patients naturally cope with stressors inherent in a procedure, how strategy use changes throughout the duration of a procedure, and how strategy use relates to subjective feelings of distress, may maximize the effectiveness of future coping skills training.

The Cardiac Catheterization Procedure

The invasive medical procedure chosen for this study was cardiac catheterization (CC), inclusive of coronary cineangiography. This procedure lends itself to the study of spontaneous coping for several reasons: 1) the stressors inherent in the procedure are likely to be severe enough to warrant acknowledgement, with subsequent coping efforts; 2) the procedure is of sufficient duration to study how the relationship between coping strategies and perceived distress changes over time; and 3) because adverse effects may result from high levels of distress during the procedure, understanding coping, and thereby maximizing its effectiveness, is imperative.

A brief presentation of the risks inherent in the CC procedure follows. Subsequently, strategies designed to assist patients in reducing distress are outlined and reviewed in terms of their effectiveness.

Inherent Risks and Complications

Cardiac catheterization is a widely used medical procedure, currently the only technique available for assessing the degree of obstruction in coronary arteries (Frasure-Smith, 1987). The procedure is lengthy (approximately one to three hours), and little or no premedication is given which might compromise the accuracy of the obtained measures (Rice, Caldwell, Butler & Robinson, 1986) or the patient's ability to cooperate. Serious complications, which occur at a rate of 1.5 to 1.8 per cent, (Frasure-Smith, 1987), include hemorrhage, infection, cardiac tamponade, pulmonary embolism, cerebrovascular accident, loss of limb, and allergic reactions (Finesilver, 1978; Gilbert & Ahktar, 1980; Cogen, 1976; Klinke, Kubac, Talibi & Lee, 1985). There is also a 0.1 to 0.2 per cent risk of death (Frasure-Smith, 1987).

For the patient, CC may be stressful for a number of reasons, including knowledge of the risks, fear of the unknown, anticipation of chest pain, and fear of impending cardiac surgery (Finesilver, 1980; Cohen & Hasler, 1987). If the patient is overly distressed, it could contribute to a longer and more difficult procedure and result in the collection of inaccurate oxygen saturations and intracardiac pressures (Finesilver, 1978). High levels of anxiety during CC have also been associated with dangerous tachyarrhthmias (Finesilver, 1980) and an increased likelihood of cardiac ischemia in patients with coronary artery disease (Watkins, Weaver & Odegaard, 1986).

Reducing the Distress of Cardiac Catheterization

The need to reduce patient distress and keep it at a minimum during CC is recognized and widely discussed in the literature. Particular emphasis has been placed on patient teaching strategies and interpersonal skills.

Recommendations for patient teaching have evolved from providing short, simple answers to patient questions (Creighton, 1959) to fully preparing the patient with knowledge about the procedure, the environment, and potential risks and complications (Myer, 1971; Cogen, 1976; Strong, 1977; Finesilver, 1980; Gilbert & Ahktar, 1980; Ventura, 1984). Having patients practice that which is expected during the procedure is also recommended (Edwards & Payton, 1976).

Although it is generally thought that patients cope more effectively when informed about both the procedure of CC and the sensations associated with it, this is not consistently supported by research. For example, Anderson and Masur (1989) found that subjects who received sensory and procedural information did not report less anxiety than control subjects during CC. Indeed, providing such information, when not congruent with the patient's usual coping style, was actually found to raise anxiety during CC (Watkins et al., 1986).

Interpersonal skills and establishing a good relationship with the patient are also considered important aspects of care (King & Folger, 1978). It is suggested that complications can be averted by discussing fears prior to the procedure (Marinelli-Miller, 1983), and by reassuring patients that the risk of complications is minimal (Teasley, 1982). When stressful periods arise during the CC, staff frequently attempt to provide patients with explanations and reassurance. However, measures of patients' cardiovascular responses to various events indicate that the dangers which they perceive are often not related to those identified by medical personnel (Wimbush, Thomas, Friedman, Sappington & Lynch, 1986). Furthermore, it has been shown that talking during the procedure is associated with higher heart rates and blood pressure, particularly when communication is with a higher-status authority figure (Wimbush et al., 1986). Crook (1973) advises that a "friendly family atmosphere in the lab team is essential" (p. 73), but it is not known to what extent staff interactions with each other influence patient distress.

The effectiveness of a variety of preparatory interventions has been reported in the research literature, but none have been consistent in minimizing patient distress during CC. On completion of the procedure, patients frequently confess how terrified they really were (Cohen, 1987; Prior, 1979), report being unable to relax during the procedure, wishing they were asleep (Frenn, Fehring & Kartes,1986), and comment "that they could undergo [heart surgery] again but they could not endure another catheterization" (Finlayson, 1978, p. 1835).

In summary, it would seem that the majority of patients find the CC procedure disturbing despite staff attempts to prepare them for it. It is suggested that attempts to intervene may have achieved limited effectiveness because they have been developed from the observations and perspectives of health personnel, and that success in coping skills training is, in part, reflective of the degree to which the training coincides with patients' natural preferences and abilities. Knowledge about untrained coping abilities is, therefore, fundamental to the development of successful interventions.

Purpose of the Study

As little is known about untrained coping efforts used by patients during the cardiac catheterization procedure, the purpose of this study was to identify spontaneous coping strategies used by patients undergoing their first CC, and to examine the relationship between various coping strategies and perceived anxiety throughout the procedure. The following research questions were addressed:

1) What is the relationship between spontaneous coping strategy use and anxiety at specified points during the cardiac catheterization procedure?

2) Does this relationship extend beyond the specified points at which it is reported?

3) Is there a difference in anxiety between subjects who maintain coping strategy use and those who shift coping strategies throughout the cardiac catheterization procedure?

CHAPTER II

LITERATURE REVIEW

Because heightened levels of anxiety during CC are not only distressing for the patient, but also associated with higher rates of complications, managing distress is of paramount importance. A review of the literature was undertaken in order to determine which coping efforts have been most closely associated with reduced anxiety during stressful procedures.

The literature pertaining to coping has been divided into two areas, each of which are discussed in this chapter. The first area involves studies of spontaneous coping. Subjects in these investigations were not trained in the use of a coping strategy; rather, their natural response to a stressor was observed in relation to experienced pain or emotional distress. The second area pertains to studies in which subjects were trained in the use of one or more coping strategies, and the effectiveness of that training in reducing pain or emotional distress was measured. In this chapter, both clinical and laboratory studies relating to the two areas of coping are presented, followed by a review of studies in which the inconsistencies in the results of coping skills training are examined.

Studies of Spontaneous Coping Strategies

Two methods of obtaining coping responses have been utilized in studies of spontaneous coping strategies. State measures have been obtained by asking subjects to report, following a procedure, how they coped during that procedure. To obtain process measures, subjects have been asked to report on coping at specified points during the procedure. The process measure of coping has been found advantageous for several reasons: it is most consistent with affective ratings; it reduces imprecision associated with retrospective reporting; it highlights fluctuations in coping as situational demands change; and it reflects the complex relationship between individual differences and situational demands (Gil, 1984; Wong & Kaloupek, 1986).

In the following clinical studies of spontaneous coping strategies, both process and state measures of coping have been utilized, whereas state measures alone were used to determine coping efforts in the laboratory studies.

Clinical Studies

Only three studies of spontaneous coping in the clinical setting were found (Kaloupek et al., 1984; Kaloupek & Stoupakis, 1985; Wong & Kaloupek, 1986). During either blood donation or dental procedures, the relationship between untrained coping efforts and patient anxiety was observed. From the process measures of coping, it was found that the avoidance method (e.g. denying the presence of a negative emotional state or wishing to be elsewhere) was most consistently related to low anxiety levels at all procedural points. A problem focus (e.g. focusing on the treatment procedure) was associated with low anticipatory anxiety for blood donation and high post dental-treatment anxiety, and an emotion focus (e.g. focusing on feelings) was associated with high anticipatory anxiety for blood donation. The behavioral method of coping (e.g. trying to find out information, or trying to relax) was associated with high anticipatory anxiety for blood donation and high post-treatment anxiety in dental patients. It was hypothesized that a behavioral method may have been difficult to use because the procedures require that the patient remain passive and compliant.

Of the state measures of coping, denial (e.g. trying to see the positive side, or not worrying) was consistently associated with low anxiety, whereas suppression (e.g. trying to keep one's mind off the problem) was associated with high anxiety.

Laboratory Studies

The results of laboratory studies of spontaneous coping are in agreement with those of a meta-analysis by Mullen and Suls (1982), which suggests that rejection strategies (focusing away from the stressor and/or one's reaction to it) produce better short-term adaptation than attention strategies (focusing on the stressor and/or one's reaction to it). More specifically, in the laboratory studies, subjects who monitored cues predicting shock experienced greater physiological and subjective arousal that those who distracted (Miller, 1979); those who focused on body sensations reported greater distress than subjects who used intellectual coping strategies (Steptoe & Wardle, 1988); and those who used suppression experienced more distress than subjects using denial (Pittner & Houston, 1980). In addition, when the stressor was unpredictable, people were more likely to be anxious and vigilant (Harris, 1981).

In summary, although the superiority of avoidance strategies is suggested, the rudimentary evidence which supports this would hardly justify implementing the teaching of such coping skills in the clinical setting. To obtain further knowledge about coping effectiveness, intervention studies, in which the effect of one or more trained coping strategies was measured, were reviewed.

Coping Skills Training Studies

In an attempt to reduce the negative impact of emotional reactions during stressful procedures, a variety of coping skills have been taught to subjects. In this review of the literature, the efficacy of these coping skills in reducing pain or anxiety, both in the clinical and laboratory settings, is presented. Because of the close connection between pain and anxiety (Schalling, 1985), the results of those studies which deal exclusively with pain are considered relevant to the present investigation.

The coping skills training studies involve teaching subjects either single or multiple coping strategies. For the reader's interest, the specific cognitive and behavioral strategies which were used in each study are presented in Table 1.

Clinical Studies

Several cognitive and behavioral coping strategies have been taught to patients in an attempt to reduce the distress associated with medical procedures, but the superiority of any single coping strategy has not been consistently demonstrated. With respect to single strategy studies, three were found in which patients were trained to use relaxation methods prior to CC; significantly less state anxiety following the procedure was reported in only one of the investigations (Whitacre, 1985; Rice et al., 1986; Frenn et al., 1986). Of interest is that when patients were asked whether they used the relaxation procedure, several reported that they did not need it, did not use it, or used their own techniques instead (Frenn et al., 1986). When women in labor were taught to actively monitor labor contractions, they reported less pain than a

Table 1

Cognitive and Behavioral Strategies Used in Coping Skills Training Studies

Study	Coping and Behavioral Coping Strategies
Anderson & Masur, 1989	Relaxation, reframing, distraction
Beers & Karoly, 1979	Rational thinking, compatible imagery, incompatible imagery, task-irrelevant cognition
Bertzen, 1987	Pleasant imagery, relaxation, distraction, somatization, imaginative transformation of pain context
Brown, 1984	Imagery, relaxation, deep breathing
Levine & Spanos, 1990	Imaginal reinterpretation, imgainal distraction, non-imaginal reinterpretation, non-imaginal distraction
Frenn, Fehring, & Kartes, 1986	Relaxation
Geden, Beck, Hauge & Pohlman, 1984	Imagery, sensory transformation, relaxation, stress-inoculation
Gilligan, Ascher, Wolper Bochachevsky, 1984	Paradoxical intention, rational self-statements, self-observation
Jaremko, 1978	Reversal of affect, rationalization, irrelevant thinking
Kaplan, Atkins & Lenhard, 1982	Relaxation, attention focusing on own ability or on doctor's ability to regulate the situation
Kaplan, Metzger & Jablecki, 1983	Relaxation, reappraisal, cognitive-behavior modification
Kendall, Williams, Pechacek, Shisslak & Herzoff, 1979	Reinforcement and rehearsal of patient's usual cognitive coping strategies
Leventhal, Leventhal, Shacham & Easterling, 1989	Monitoring pain
Lyles, Burish, Krozely & Oldham, 1982	Muscle relaxation, guided-relaxation imagery
Martelli, Auerbach, Alexander & Mercuri, 1987	Self-statements, relaxation, discrimination among and labeling of sensations
Rice, Caldwell, Butler & Robinson, 1986	Relaxation
Scott & Barber, 1977	Pleasant thoughts, set self not to be bothered by pain, distract self, dissociate self from pain, reinterpret pain, imagine numbness
Spanos, Brown, Jones & Horner, 1981	Imagine arms as numb and insenstive
Steptoe & Vogele, 1986	Intellectualization, sensation-focusing
Tan & Poser, 1982	Deep breathing, relaxation, imagery, distraction, self-talk
Thelan & Fry, 1981	Selective attention, modeling
Whitacre, 1985	Relaxation

control group; however, these findings were not replicated in a follow-up study by the researchers (Leventhal, Leventhal, Shacham & Easterling, 1989). In an evaluation of outcome studies in which information, relaxation, cognitive-behavioral, or modeling interventions had been taught to subjects undergoing noxious medical procedures, evidence was found to support the use of each type of intervention, particularly modeling and cognitive-behavioral techniques (Ludwig-Rosenthal & Neufeld, 1989).

In studies where subjects were taught a combination of coping strategies, they generally fared better than those trained in single strategy use. Specifically, teaching a combination of coping strategies has been found effective in reducing the perceived intensity and duration of migraine headache (Brown, 1984); nausea, anxiety and physiological arousal associated with cancer chemotherapy (Lyles, Burish, Krozely & Oldham, 1982); anxiety associated with cardiac catheterization (Kendall, Williams, Pechacek, Shisslak & Herzoff, 1979; Anderson & Masur, 1989) and sigmoidoscopy (Kaplan, Atkins & Lenhard, 1982); and in enhancing adjustment to oral surgery (Martelli, Auerbach, Alexander & Mercuri, 1987). However, in patients undergoing painful electromyographic examinations, relaxation alone was as effective as multiple techniques (Kaplan, Metzger & Jablecki, 1983), and for patients having arthrograms, those who learned multiple strategies fared no better than the untrained control group (Tan & Poser, 1982).

Laboratory Studies

In laboratory investigations, a variety of single strategy cognitive coping techniques have been taught to subjects to reduce the intensity and distressing qualities of pain or anxiety. After learning to use a strategy, subjects have generally succeeded in either increasing their tolerance to pain (Beers & Karoly, 1979; Scott & Barber, 1977; Thelan & Fry, 1981; Jaremko, 1978; Gilligan, Ascher, Wolper & Bochachevsky, 1984) or in reducing the subjective qualities of pain (Geden, Beck, Hauge & Pohlman, 1984; Spanos, Brown, Jones & Horner, 1981) or anxiety (Steptoe & Vogele, 1986). In none of the studies did these phenomena occur together, suggesting that subjects are able to carry out either one task or the other, but find it difficult to succeed at both tasks simultaneously (Scott & Barber, 1977).

Conceptualizing and evaluating coping strategies is made difficult by the variation in terminology between the studies, but allowing for these difficulties, a consistently superior strategy has not been identified. When groups of subjects trained in one of four "maximally different" coping strategies were compared, (Devine & Spanos, 1990), significant differences in the amount of pain reduction to cold pressor tests did not occur.

Similarly, in a review of the literature on the utilization of cognitive coping strategies, when strategies were classified into six groups, each was found to be effective in significantly attenuating pain, although imagery and pain acknowledgement were the least effective (Fernandez & Turk, 1989).

Instructions in coping which incorporate multiple strategies have generally been more effective than single strategy use in increasing tolerance to pain (Scott & Barber, 1977; Thelan & Fry, 1981) or reducing subjective discomfort (Berntzan, 1987; Scott & Barber, 1977; Thelan & Fry, 1981), although in one study, no difference was reported (Geden et al., 1984). It is suggested that multiple strategies may be more effective because an individual can select the preferred method as well as switch from one strategy to another.

Examining Inconsistencies in Coping Skills Training Studies

The inability to determine a consistently effective method of coping training has led to a number of further investigations. The relationship between frequency of strategy use and effectiveness has been examined, yielding no significant correlation (Tan & Poser, 1982). It has been found that some control subjects spontaneously use coping strategies, whereas others do not use the strategies in which they are trained (Berntzan, 1987; Frenn et al., 1986). Skills training may, in fact, interfere with one's use of preferred strategies. In clinical studies where training has reinforced previously learned coping strategies (Kendall et al., 1979; Brown, 1984) or has been matched to preferred coping styles (Martelli et al., 1987), patient distress has been reduced. Unfortunately, in most of the studies, neither the subjects' preferred coping strategies nor the strategies used during the experimental procedures were elicited, so knowledge about the interaction between these variables and coping skills training is limited.

The amount of time which has elapsed between the training and measurement of the dependent variable has been found to influence the effectiveness of an intervention. In a study by Anderson and Masur (1989), cardiac catheterization patients were divided into four experimental groups: modeling, cognitive-behavioral skills intervention, modeling plus cognitive-behavioral skills, and a control group. Among other dependent measures, subjective anxiety was reported before the CC, immediately after, and one to six hours later. Prior to the CC, there were no differences between groups; after the procedure, the modeling and modeling plus cognitive-behavioral skills groups reported significantly less anxiety; and one to six hours after, all treatment groups were significantly less anxious than the control group.

Although lengthy training periods may have enhanced subjects' utilization of coping strategies in several clinical studies (Kendall et al., 1979; Lyles et al., 1982; Brown, 1984), brief interventions have also been effective (Whitacre, 1985). In testing for the effects of training time in the laboratory setting, it was found that groups given long versus brief instructions in coping strategy use did not differ in their ability to tolerate pain (Scott & Barber, 1977).

It has also been questioned whether training subjects to use coping strategies achieves its effect simply by giving them permission to do so. Indeed, subjects in the laboratory setting who have been told to do whatever they could to reduce pain have fared as well as those who received cognitive skills training (Klepac, Hauge, Dowling & McDonald, 1981; Spanos, Hodgins, Stam & Gwynn, 1984). Furthermore, subjects often refrain from using strategies unless given explicit instructions to do so (Spanos et al., 1984).

In light of the questions raised by the inconsistencies in both laboratory and clinical coping skills training studies, it would appear that the benefits of coping skills training, generally failing to account for the natural abilities and preferences of subjects, have been somewhat overestimated.

Relevance of Literature Review to Study

In studies pertaining to spontaneous coping strategy use, avoidant coping strategies and denial were generally associated with less distress during blood donation and dental procedures. It is unknown, however, to what extent these findings will generalize to other procedures. Because CC imposes a higher degree of invasiveness and intensity, it may adversely affect the use of techniques such as distraction as coping mechanisms (Miller, 1980). The procedure is also of a longer duration so, although avoidance may be effective early in the procedure, it is not known whether patients can remain inattentive to the body sensations and environmental stressors of the CC.

Because the connection between affective and coping variables is poorly understood, it is not apparent how and when coping skills training should be applied to achieve the desired outcome (Kaloupek, 1987). Training patients to use coping strategies without knowledge of their untrained coping abilities is not only costly and time-consuming, but may be no more effective than how they spontaneously manage (Tan & Poser, 1982; Rice et al., 1986). Prior to the development of pre-procedural programs, there is a need for naturalistic investigation of the coping strategies used by patients undergoing the specific procedure.

To date, no attempts have been made to ascertain the breadth of coping strategies spontaneously used by patients undergoing CC. Because the choice of coping strategies and its relationship to pain and anxiety fluctuate throughout a procedure (Kaloupek et al., 1986), research is needed not only to identify the coping strategies which are used, but to monitor whether strategy use changes throughout the procedure and how it relates to subjective feelings of distress.

CHAPTER III

PROCEDURE

The data for this study consisted of a subset of raw data collected in a larger study. An overview of the methods by which data was obtained in the larger study is presented in Table 2; further details are found within the informed consent for the larger study in Appendix A. Only patients' subjective ratings of anxiety (SUDS numbers), obtained at six points during the cardiac catheterization, and the coping responses from the post-CC interview, were used in this study. This chapter includes the methods by which anxiety and coping data were obtained in the larger study, and the process by which coping responses were selected from the post-CC interviews for this study.

Sample and Setting

Subjects in the larger study were in-patients on one of two cardiology units at a large urban teaching hospital who met the following eligibility criteria: 1) 18 years of age or older; 2) ability to read, write and understand the English language; 3) scheduled for a first CC; 4) free from incapacitating physical or psychological discomfort; and 5) not a member of a health profession.

A data subset from the first 62 patients in the larger study was used for analysis in this investigation. This

Table 2

Overview of Data Collection Procedures in the Larger Study

Time	Setting	Data Collection
Evening before the CC	Patient's room	Consent obtained. Pre-intervention assessment data obtained. SUDS* training done. Prepared for post-CC interview. Post-intervention assessment data obtained.
Morning of the CC	Patient's room	Pre-catheterization assessment data obtained.
During the CC	CC lab	SUDS numbers obtained on arrival and at six points during the CC.
Immediately following CC	Recovery bay	Post-CC interview obtaining appraisal and coping data.
After the CC	Patient's room	Post-CC assessment data obtained.

*Subjective Units of Disturbance Scale (Wolpe and Lazarus, 1966).

data subset consisted of patients' SUDS ratings, reported six times during the CC, and their recollection of how they were coping at those times, reported immediately following the CC procedure. Demographic variables relating to age and sex of subjects and procedural duration were also included. A correlational design was then used to describe and explain the variations in anxiety based on patients' use of coping strategies.

Data Collection Procedures

In order to study the fluctuations in coping and anxiety throughout the CC procedure, data relating to these variables were collected at six different points. Following a description of these points, the methods used to obtain coping and anxiety data, including patient training procedures, is presented.

Procedural Points

The six points at which SUDS numbers were elicited during the cardiac catheterization were termed procedural points (PP). Reflecting distinct and identifiable events during the procedure, they are briefly outlined:

PP1: The groin wash begins. This takes place once the patient is in the CC lab and before draping is done. The groin area is exposed except for a folded towel placed over the genitals. The wash feels cool to the patient.

PP2: Local anaesthetic is administered following the draping of the patient. The injections are both superficial and deep into the groin tissue.

PP3: The introducer, a device through which the catheters are threaded, is inserted. The patient usually feels pressure at the site during this time.

PP4: The dye insertion begins. A bolus of contrast media is injected, and the patient typically feels a warm sensation throughout the body.

PP5: The CC procedure is complete. Following the last injection of contrast media, the cardiologist usually tells the patient that the procedure is finished. Room lights are turned on and staff remove their masks.

PP6: The patient is prepared to leave the CC lab. The drapes are removed and the patient is transferred to a stretcher prior to entering the Recovery Bay.

Anxiety across Procedural Points Data

The SUDS method involves having individuals rate and report their anxiety level using an 11 point scale, where zero represents no anxiety and ten indicates panic or an extremely high reaction. SUDS data was collected by asking patients at each procedural point during the CC to verbally report their SUDS number. Each number was recorded by the research assistant present during the CC.

Training in the use of the SUDS method took place in the patient's room the evening before the CC was scheduled.

In describing this numbering system, patients were told that zero would represent feeling entirely calm, comfortable, at peace and relaxed, or in other words, in no distress whatsoever. Ten, the opposite end of the scale, would represent feeling extremely apprehensive, frightened, anxious or distressed. As these numbers were explained, patients were asked to think of a time or event in their lives where their numbers would have been at a zero and at a ten. These events were written on a sheet of paper with the corresponding numbers. Events were also elicited to correspond with a three, five, and a seven, thereby creating a personally meaningful measure of distress. It was explained that there were no right or wrong answers, and that the numbers which people would use to describe the same event would vary. To further ensure understanding, patients were asked to report the lowest and the highest that their numbers had been since entering the hospital, and to give their present SUDS number. They were then told that in order to understand how distress levels vary throughout cardiac catheterization, the research assistant would ask them to verbalize their SUDS numbers on arrival to the CC lab and at six different points during the procedure.

Coping across Procedural Points Data

Immediately following the SUDS training, patients were prepared to report their situational appraisals and coping strategies. It was explained to them that people's distress levels were related to what they were thinking, or for some, to the images or pictures in their minds. Using one or two of the situations identified by patients during SUDS training, their associated thoughts were elicited. It was then explained, using the identified thoughts or images, that both anxiety producing thoughts and coping thoughts typically occur when the SUDS number is elevated, and that the research assistant would ask about both types of thoughts in a tape-recorded interview following the CC.

Identifying Coping Strategies from Interview Data

The transcribed interviews from the larger study consisted of data relating to patients' appraisals and coping strategies as they progressed through the CC procedure. As only the coping responses were required for this research study, the cognitive theory of emotions (Lazarus & Folkman, 1984), briefly described next, was used as a framework by which to identify and to separate coping responses from the appraisal data.

The Cognitive Theory of Emotions

In the cognitive theory of emotions, it is explained how, through the processes of cognitive appraisal and coping, the person and the environment mutually interact during a stressful encounter such as CC.

Through cognitive appraisal, comprised of primary and secondary appraisal and reappraisal, the person evaluates the significance of an encounter to his or her well-being. Primary appraisal involves an assessment of the degree of harm, threat or challenge which a situation poses, whereas through secondary appraisal, an assessment is made of one's resources for dealing with the stressor or with the arousal response to it. Primary and secondary appraisals converge to determine if the event is significant in that it involves some degree of harm, threat or challenge. Specific to the appraised meanings are the emotional responses experienced by the individual.

Coping refers to the cognitive and behavioral efforts used to manage a stressful situation. It may be problem-focused, that is, aimed at altering the stressful situation, or emotion-focused with the intent of regulating emotions and relieving tension. If initial appraisal has resulted in coping, the situation will be reappraised to determine the results.

The outcome of an encounter cannot be determined solely by objective criteria, but must include the individual's perception of the extent to which there was successful resolution of the stressful encounter, based on his or her own values, expectations and goals. In other words, coping is successful when the individual perceives it to be so.

Definition of Terms

Based on an understanding of the cognitive theory of emotions, coping strategies were defined as the individual's verbal descriptions of behavioral and/or cognitive efforts to master, reduce or tolerate the internal and external demands of the situation. Situational demands were defined as requisites for overt or mental action, with external demands being a function of the individual's external environment, and internal demands being an individual's internally generated psychological and physiological needs (Cox, 1978). It was recognized that coping strategies are contingent upon one's appraisal of the situational demands.

Anxiety was defined as subjective feelings of apprehension or distress, and was determined by patients' verbal reports of their SUDS numbers at each procedural point during the cardiac catheterization procedure.

Selection of Responses

Coping responses, as defined above, were selected and recorded by the researcher from sixty-two transcripts. When data were available, the coping strategies and corresponding SUDS numbers were identified for each of the six procedural points during the CC. (Coping data were missing from some of the transcripts as patients had not been asked how they had managed their distress at that time.) Coping responses were then placed into categories prior to data analysis. The process by which the coping categories were developed and responses were scored is described in Chapter 4.

Ethical Considerations

For this research project, existing data from the larger study which incorporated the elicitation of coping strategies and procedural SUDS scores was accessed. A separate consent was not obtained as no new data was procured, and neither were there additional benefits or risks to the subjects. The consent form for the larger study included consent for secondary analysis of data. (See Appendix A for consent form.)

CHAPTER IV

DEVELOPMENT AND UTILIZATION OF THE CCPING WITH INVASIVE MEDICAL PROCEDURES SCORING SYSTEM

As there was no scoring system available by which to categorize coping data obtained during procedures such as cardiac catheterization, the Coping with Invasive Medical Procedures (CIMP) Scoring System was developed. The process by which this system was developed and utilized is discussed in this chapter.

Development of the Coping with Invasive Medical Procedures Scoring System

A two-step process was used in the development of the CIMP Scoring System. First, the latent partition analysis (LPA) model, developed by Wiley (1967), was used to provide an initial grouping or categorization of coping responses. Secondly, the final scoring system was developed, wherein some of the categories identified using the LPA model were combined in order to provide more theoretically distinct groupings.

Latent Partition Analysis

In the LPA model, categorizations done by individual sorters are termed manifest partitions. Latent partitions, hypothesized to underlie the manifest partitions, are formulated via the model when items common to sorters are grouped together.

To form the manifest partitions, a representative sample of fifty coping responses was selected by the researcher from the total pool of 315 coping responses in the raw data. These responses were written on cards and given to eleven sorters, all with a nursing background. The sorters were asked to place the cards into groups or categories which contained similar types of coping responses, and to provide a brief descriptor of each category. The number of groups into which the cards were to be sorted was not specified. Sorters produced between six and ten manifest partitions.

A 50 x 50 matrix of coping responses was then formulated, wherein the number of times sorters placed each pair of coping responses into the same manifest category was recorded. For example, if three cards were grouped together by one sorter, it would be recorded that Card 1 had been sorted with Card 2 once and with Card 3 once, and that Card 2 had been sorted with Card 3 once. This matrix served as input data for the LPA model on the University of Alberta Division of Educational Research Services computer program, SCAL06. Twelve latent partitions resulted. The coping responses which comprised each of the partitions are listed in Appendix B.

Scoring System Finalization

Reorganization of the twelve partitions into the final eight categories was based on a theoretical understanding of coping and was supported by a confusion matrix which was generated through latent partition analysis.

The responses in each partition were first surveyed for similarities in coping, and descriptive labels were applied to the partitions. From a theoretical perspective, some of the categories were very similar and thus combined; others showed some overlapping of responses between categories and were reorganized into more appropriate theoretical partitions.

The confusion matrix indicated the probability that items from one category had been sorted with those from another. High probabilities between two categories suggested that responses in the categories were similar, or that there was some tendency for overlapping of categories to occur. Generally, the confusion matrix data was in agreement with the theoretical reorganization of latent partitions. Probabilities higher than .25 are shown in Table 3. Although relatively high probabilities occurred between LPA Model partitions #6 and #11, and between #11 and #12, these were identified as theoretically distinct categories and were not altered. Formulation of the final eight categories from the original twelve LPA model partitions is shown in Table 4.

Table 3

Confusion Matrices of Latent Partitions above .25

	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12
#1												
#2												
#3												
#4		.30										
#5				.48								
#6												
#7												
#8						.35						
#9												
#10									.28			
#11				.28		.28						
#12											.30	

Table 4

Formulation of Coping Categories from Latent Partitions

Final Categories	Latent Partitions
Positive Reframing	#1
Control	#2, #11, and part of #4
Relief Focusing	#3
Distraction	#5 and part of #4
Comparison of Expectations	#6 and #8
Faith in Others	#7
Passive Coping	#9 and #10
Hoping	#12

Descriptions of the categories were formulated, including the identification of sub-categories or types of responses occurring within some of the main categories. A description of each coping category and sub-category, and the coping responses which exemplify them, follows. Table 5 contains a concise representation of the CIMP Scoring System.

1. Positive Reframing: Individuals view situational demands as pleasant or positive, rather than neutral, negative or harmful.

Examples:

> The hot flash was a real great feeling, just like a hot shower.
>
> I'm so lucky to be here and to have this done.

Table 5
Coping with Invasive Medical Procedures Scoring System

Coping Strategy	Description of Coping Strategy
1. POSITIVE REFRAMING	1. Views stressful situational demands as pleasant or positive.
2. CONTROL	2. Focuses attention on situational demands in an effort to control the outcomes.
a. Self-reassurance	a. Mentally talks to self in a reassuring manner.
b. Monitoring	b. Keeps track of the procedure, responses, and/or activities of others. Remains aware of what is happening.
c. Information gathering or dispersal	c. Asks for information or informs staff of potential problems.
d. Cooperating	d. Tries to ease demands by relaxing or following instructions.
e. Praying	e. Recruits assistance of God in managing the situation.
3. RELIEF FOCUSING	3. Focuses on a reduction in, or termination of, situational demands, often experiencing reduced anxiety. Expressions of relief may be directed or implied.
4. DISTRACTION	4. Diverts attention away from situational demands or responses to it. Diversions are extraneous to situational demands.
5. COMPARATIVE COPING	5. Compares expectations of situational demands with what is actually experienced.
a. Accurate comparisons	a. Experienced demands are perceived as similar to what was expected.
b. Favorable comparisons	b. Experienced demands are favorably compared to previous expectations of situational demands. May be expressed through minimizing the experienced demand.
6. FAITH IN OTHERS	6. Places trust in God or the skills and abilities of staff, without attending to situational demands.
7. PASSIVE COPING	7. Either perceives no external or internal demands or, when demands are perceived, does not attempt to manage them.
a. No internal demands	a. Denies feeling worried or anxious.
b. No external demands	b. Perceives environment as non-threatening.
c. No attempt to manage demands	c. May acknowledge situational demands, but makes no attempt to manage them. May express acceptance or resignation.
8. HOPING	8. Wishes for certain events to happen. Desires are oriented toward the demands of the situation.

> It was neat. Like I felt the back of my head and my elbows being warm. I could feel it going through my arms, and I thought this is pretty neat.
>
> I thought that it felt nice because I was cold.

2. Control: Individuals focus their attention on the situational demands in an effort to control the outcomes. Five types of control are identified:

a. Self-reassurance: Individuals mentally talk to themselves in a reassuring manner.

Examples:

> This is just a little needle which is not going to hurt.
>
> There's that possibility [of risks], one in 500, but I said, no that's not me, everything is going good.
>
> He's done so many and I'm a healthy one. I've never had a heart attack, so I've got all these pluses.

b. Monitoring: Individuals keep track of the procedure, their responses, and/or the activities of others. It is important to them that they remain aware of what is happening.

Examples:

> I was trying to see what was going on, to keep track of everyone.
>
> I got to see exactly what was going on. She explained it and that really helped, too.
>
> Everybody looked like they knew what they were doing.

They looked like everything was fine.

c. Information gathering or dispersing: Individuals ask for information about the procedure or inform staff about potential problems.

Examples:

I asked him what he was going to do next.

I told him that those machines were getting pretty close to me.

I asked her what she was doing now. It's a lot easier for me if I know.

d. Cooperating: Individuals actively try to make the procedure easier by relaxing or following directions.

Examples:

I was trying to relax because I was told those tubes go in a lot easier then.

I was trying to follow their directions.

e. Praying: Prayer is used to recruit the assistance of a higher being in managing the situation, not as a method of distraction.

Examples:

I was talking to my Lord, asking Him to help them and to help me.

I continued to pray, asking God to help me get through it.

3. Relief Focusing: Individuals focus on a reduction in, or a termination of, specific situational demands and

frequently experience an alleviation of anxiety. Expressions of relief may be direct or implied. In this category, no comparison is made to what had been expected.

Examples:

> What a great feeling that it was done! Glad its over.
>
> They said they were done and I knew they wouldn't be shooting that dye in and making me sweat.
>
> It was a big relief and my anxiety level went right down.
>
> Well, it was over, so I settled down. You know, [the anxiety] just comes down by itself.

4. Distraction: Individuals divert their attention from the internal and/or external demands of the situation or their responses to it. The diversions used are extraneous to the demands of the situation, that is, they are not focused toward meeting a specific demand such as relaxing to ease pain, or wishing for food if feeling hungry.

Examples:

> Talking to the staff kept my mind off of it.
>
> I kept it out of my mind so that it wouldn't bother me.
>
> I kept praying rather than concentrating on the pressure.
>
> I was focusing on a scene in my mind...sitting out on the lake and waiting for the pickerel to bite.

5. Comparative Coping: Individuals compare their

expectations of the situational demands to their actual experiences. Comparisons are of two types:

a. Accurate comparisons: The experienced demands are the same as, or similar to what was expected. Through previous learning, preconceived ideas, similar experiences, etc., individuals feel that they were prepared for the actual situational demands.

Examples:

> They warned me that this would happen, so I expected it. That really helped me to cope.
>
> I've had lots of freezing done before, so this was nothing different.

b. Favorable comparisons: What one experiences is favorably compared to previous expectations of the situational demands. At times, this may not be explicit, but is expressed through minimizing the experienced demand.

Examples:

> I was expecting it to be longer and more uncomfortable, but it wasn't.
>
> It wasn't what I thought it would be like. I expected something hot, painful actually.
>
> I was surprised that it was so simple.

6. Faith in Others: Individuals place their trust in the skill and abilities of the staff or in a higher being, without attending to internal or external demands.

Examples:

I'm being taken care of by experts. They know what they're doing.

I knew that God would take care of me.

It would have been different if I had a different doctor. But I knew she was really good.

7. Passive Coping: Individuals either perceive no internal or external situational demands or, when demands are perceived, do not actively attempt to manage the demands. Three types of passive coping responses are identified:

a. No internal demands: Individuals deny that they feel worried or anxious.

Examples:

I wasn't worried. I felt calm and peaceful.

I was just relaxed. I didn't worry and I wasn't scared.

b. No external demands: The environment is perceived as non-threatening.

Examples:

Everything was okay. There was nothing to worry about.

I didn't feel anything at all because everything went so smoothly.

c. No attempt to manage the demands: Although situational demands may be acknowledged, no attempts are made to manage them. Acceptance of, or resignation to the situation are frequently expressed.

Examples:

I wasn't trying to control it...just let things go.

I just shut my eyes and let it happen. Waited for it to be over.

I just resigned myself to the fact that it had to be done.

8. Hoping: Individuals wish for or desire certain events to happen. Unlike coping by distraction, the thoughts are oriented toward the demands of the situation.

Examples:

I hoped it would be over soon.

I wished I could know the results right away.

I was thinking about having a hot coffee to warm up.

Hopefully, it will be better next time. They have to do it again, so I will live in hope.

Scoring Rules

The rules for categorizing the coping strategies were developed and refined as initial scoring of coping responses occurred. They were finalized as follows:

1. Read the entire procedural point coping response and try to determine the meaning of it.

2. Score all of the procedural point responses sequentially for each individual, as this may add to the meaning of the responses.

3. There may be more than one coping strategy used during

each transaction. Use as many categories as apply.

4. Appraisal of the situation will underlie all coping strategies, either implicitly or explicitly. This is not to be confused with "monitoring", a type of "control".

5. If an individual says that he/she was not worried or was doing nothing to cope, then goes on to say how coping occurred (via one of the coping categories), do not score it as "passive coping". Use only the alternate category or categories which apply.

Utilization of the Scoring System

Once the CIMP Scoring System was developed, the researcher's thesis supervisor was trained in the use of the system so that inter-rater reliability could be assessed. Coping categories and scoring rules were discussed and clarified as random responses were scored. Training continued over a three hour period until, using a random sample of 45 coping responses, 79 per cent agreement was achieved.

The researcher then proceeded with scoring of all coping responses. During that time, four reliability checks took place whereby the second rater categorized a random sample of six or seven responses. The number of coping responses used in the reliability checks, and the percentage of agreement between raters are listed in Table 6.

Table 6

Inter-rater Reliability Ratings using the CIMP Scoring System

	No. of Responses	% Agreement
Training reliability	45	79
Reliability check #1	6	71
Reliability check #2	6	56
Reliability check #3	7	70
Reliability check #4	7	100
Overall reliability	71	77

CHAPTER V

FINDINGS AND DISCUSSION

The purpose of this study was to examine the relationship between coping strategies and perceived anxiety throughout the invasive medical procedure of cardiac catheterization. In addressing this purpose, the following research questions were asked:

1) What is the relationship between spontaneous coping strategy use and anxiety at specified points during the cardiac catheterization procedure?

2) Does this relationship extend beyond the specified points at which it is reported?

3) Is there a difference in anxiety between subjects who maintain coping strategy use and those who shift coping strategies throughout the cardiac catheterization procedure?

Each of these research questions is addressed following a description of anxiety and coping variables as they occurred throughout the CC procedure.

Anxiety across Procedural Points

At each of the pre-designated procedural points, subjects were asked to report their SUDS numbers. The means and standard deviations of these SUDS reports are listed in Table 7.

Table 7

Mean SUDS Scores across Procedural Points

Procedural Point	Cases	M	SD
1. Groin wash	61	3.418	2.112
2. Local anaesthetic	62	4.129	2.315
3. Introducer inserted	62	4.298	2.382
4. Begin dye insertion	61	4.393	2.284
5. Dye insertions complete	62	3.500	2.175
6. Prepared to leave CC lab	62	3.177	2.047

Analysis of variance of SUDS scores over time showed a significant main effect for time ($F=10.44$, $df=5$, $p<0.01$). Student Newman-Keuls post-hoc multiple comparisons ($p=0.05$) demonstrated that anxiety at PP2, PP3, and PP4 was significantly higher than at PP1, PP5, and PP6. Despite the fact that SUDS ratings dropped at the last two PP's, they remained similar to what they were when the groin wash was done at PP1. Although the procedure was complete, it was clear that patients were still experiencing considerable distress.

The correlation between SUDS scores at adjacent procedural points ranged from .67 to .88, and are reported in Table 8. High correlations and similarity of means and standard deviations between SUDS scores at PP1 and PP2, and between PP2 and PP3 indicate that there was little change in reported anxiety between these points. Each of these

Table 8

Correlations between SUDS Scores at Adjacent Procedural Points

	PP2	PP3	PP4	PP5	PP6
PP1	.85				
PP2		.88			
PP3			.67		
PP4				.72	
PP5					.86

points (the groin wash, injection of local anaesthetic, and insertion of the introducer) was associated with procedural preparation, that is, they occurred prior to insertion of the catheters into the body. Likewise, there was little change in reported distress levels between PP5 and PP6. At PP5, the dye insertions were complete and the patient was usually told at this time that the procedure was over. PP6 took place a few minutes later as the patient was prepared to be transferred into the recovery bay. At both of these points, although concerns may have remained, the patient was aware that the actual CC was finished.

The lowest correlation was found to be between PP3 (insertion of introducer) and PP4 (immediately after the main dye injection), indicating a larger degree of change between the reported SUDS numbers of these two PP's than between those of other adjacent points. At PP4, the catheters had been threaded into the heart, and the patient experienced the "hot flush" associated with the dye injection. Many patients later reported that they knew that if anything was going to happen (such as a heart attack or stroke), this was the time that it would occur. At PP5, patients knew that the procedure was complete. The relatively low correlation between SUDS scores at PP4 and PP5 (.72) may therefore be reflective of a greater change in the perceived demands of the situation.

The Influence of Demographic Variables on Anxiety

Data from sixty-two subjects, comprised of 41 males and 21 females, was utilized for this study. Ages ranged from 40 to 72, with a mean age of 57. The average length of time spent in the CC laboratory was 63.5 minutes, with individual procedures ranging from 25 minutes to two hours and 35 minutes.

Duration was found to be significantly and positively correlated with the SUDS score (.26) only at PP5 (see Table C-1, Appendix C). At the outset of the procedure, a patient would be unaware that the CC would take longer than usual, and would remain unaware of this likelihood at PP1, PP2, and PP3. In a small number of patients, the presence of calcified heart valves made it difficult to move the catheter across the valve prior to the dye injection at PP4. Although it is likely that the patient would be aware that the procedure could take longer at this point, there was no significant correlation between the PP4 SUDS score and duration. At PP5, the low positive correlation indicates that subjects who underwent procedures of a longer duration were reporting slightly greater anxiety than those who did not. It is likely that these patients, lying on the CC table for an extended period of time, experienced more concerns that the procedure was not going smoothly, as well as greater physical distress (aching backs and other muscular and joint discomforts, urge to void, feeling chilled, groin discomfort as the local anaesthetic wore off). By PP6, the correlation was no longer significant, perhaps reflective of the patient's belief that the procedure was indeed finally over, as he or she was moved from the CC table back onto a stretcher and was prepared to leave the CC lab.

Analysis of variance of SUDS scores showed non-significant F-ratios for sex, and for sex across time. Likewise, there was no interaction between age and time in SUDS scores.

Coping Strategy Use across Procedural Points

The frequency with which coping strategies were used varied considerably both between and within procedural points. Table 9 shows the number of times each coping strategy was reported at individual procedural points, and

Table 9

Frequency of Reported Coping Strategy Use throughout the Cardiac Catheterization Procedure

	PP1	PP2	PP3	PP4	PP5	PP6	Total
Pos. Reframing	1	0	1	10	3	2	17
Control	17	21	24	16	4	8	90
Relief Focusing	1	1	1	8	38	28	77
Distraction	1	13	9	3	0	0	26
Comparisons	5	13	12	22	7	1	60
Faith in Others	4	5	1	2	1	2	15
Passive Coping	14	9	9	7	4	3	46
Hoping	5	2	4	1	6	6	24

the total number of times it was reported throughout the CC procedure.

"Control" was the coping strategy used most frequently throughout the procedure, and was reported more often than any other strategy during the first three procedural points. Subjects continued to use "control" during the dye injection at PP4, with use of this strategy declining during the last two PP's.

"Relief focusing" was also used frequently, but its occurrence was noted at opposing points to that of "control". Specifically, it was used infrequently during PP1 to PP3, somewhat at PP4, and a great deal at PP5 and PP6. At these last points, patients generally expressed relief that the entire procedure was finished.

"Comparative coping" ranked third in overall strategy use and was utilized most between the injection of local anaesthetic at PP2 and the dye injection at PP4. At these most stressful points, this group of patients noted that either their negative expectations had been excessive, or they had accurately anticipated the event.

Patients' expressed "passive coping" techniques most often during the groin wash. Decreasing use of this strategy throughout the remaining procedure may indicate that patients had difficulty implementing it as the stressors intensified.

"Distraction" was used little during the groin wash, most during the local anaesthetic injection, with tapering use during PP3 and PP4. Although many patients discussed stressors during the final two procedural points (such as physical discomforts and concern about the CC results), they did not use distraction to cope with them.

"Hoping", used relatively infrequently during the CC procedure, occurred most often at the beginning and at the end of it, suggesting that patients hoped that the CC would progress well, and that the results would be favorable.

"Positive reframing" was rarely used except during PP4. Whereas it may have been easy to relate the warm feeling of the dye injection to a pleasant experience such as lying in the sun or having a warm shower, it would seem that patients had difficulty coping in a similar manner when experiencing the discomfort of the local anaesthetic or of the introducer being inserted. It is unlikely that the coolness of the groin wash was the actual concern at PP1; rather fears of the upcoming procedure would more likely raise the SUDS number. Likewise, it would be difficult to positively reframe the concerns at PP5 and PP6, which centered on finding out the results of the procedure.

"Faith in others", used least throughout the CC procedure, was reported most often at PP1 and PP2. Increased staff interactions with patients during these initial procedural points may account for the greater frequency with which it was reported.

The Influence of Demographic Variables on Coping

Sex was not found to be significantly correlated with the use of any one coping strategy. Although age showed a number of significant positive and negative correlations with strategy use at each procedural point (reported in Table C-2, Appendix C), these were scattered. Positive correlations occurred between age and "positive reframing", "faith in others" and "passive coping", indicating that older subjects were more likely to use these strategies during PP5, PP2, and PP1 respectively. Likewise, significant negative correlations occurred with "control" at PP3, "relief focusing" at PP1, "distraction" at PP1, and "comparison of expectations" at PP6. Although there seems to be some tendency for older patients to use strategies which are correlated with lower anxiety, the value of this information is limited as no correlation between age and anxiety was found.

Duration of the procedure, correlated with coping strategy use at each PP, also showed some significant results (see Table D-1, Appendix D). However, as significant correlations occurred early in the procedure (PP1 and PP3), as well as at PP4 and PP5, it would appear that interactions with unknown variables limit the immediate usefulness of this information.

Coping Style during the CC Procedure

It was noted that some patients were consistent in their choice of coping strategies throughout the CC procedure, while others shifted from one strategy to another. "Consistent copers" were defined as those patients who reported using the same coping strategy at three or more consecutive procedural points; "versatile copers" did not.

Of the 62 patients used in this study, 28 were identified as consistent copers, and 16 as versatile copers. The remaining 18 patients could not be classified, as coping responses were missing from the transcripts during one or more of the procedural points.

The Relationship between Coping and Anxiety

Question 1: What is the relationship between spontaneous coping strategy use and anxiety at specified points during the cardiac catheterization procedure?

The relationship between coping strategy use and anxiety was found by computing point biserial correlations of each coping strategy with the corresponding SUDS score at each procedural point. The results, reported in Table 10, indicate that "control" and "hoping" were associated with the highest anxiety levels, and that "passive coping" and "positive reframing" were associated with lowest anxiety.

"Control" was significantly and positively correlated with distress at PP1, PP2, and PP3, suggesting that, at these relatively stressful procedural points, subjects actively tried to control the outcomes by focusing their attention on the existing situational demands, but had limited success in reducing anxiety. Although no significant relationship occurred at any other procedural point, the correlation changed from a positive to a negative direction at PP4 and PP6.

According to Folkman (1984), threat appraisals, accompanied by negative emotions such as anxiety, seem likely when the desire for control is not matched by one's expectations for control. For example, high-monitoring hypertensive patients who scanned for cues and attempted

Table 10

Correlations of SUDS Scores with Coping Strategy Use at each Procedural Point

Coping	PP1	PP2	PP3	PP4	PP5	PP6
Pos. Reframing	-.10	--	-.11	-.26*	-.13	-.04
Control	.34*	.25*	.25*	.10	-.15	-.06
Relief Focusing	.10	.17	-.02	.17	-.07	.08
Distraction	-.12	-.07	-.14	.07	--	--
Comparisons	-.07	-.14	-.09	-.13	-.19	-.08
Faith in Others	.14	.06	-.14	.11	.33*	-.17
Passive Coping	-.29*	-.16	-.14	.05	.14	.03
Hoping	.25*	.24*	.24*	-.08	.20	.13

*significant at p<.05
--coefficient could not be computed

to exert control in largely uncontrollable situations were less effective in their coping (Miller, Leinbach & Brody, 1989). Similarly, women who monitored labor contractions experienced less pain and negative moods than the control group when they could actively control the situation by pushing (Leventhal et al., 1989). To summarize, when one's perceived abilities exceed the demands of the situation, the sense of control is likely to be associated with positive emotions, whereas the opposite is true when there is a perceived lack of control (Clarke, 1984).

Mattlin, Wethington & Kessler (1990) found that people who used active cognitive coping to deal with life events experienced significantly greater anxiety and depression, particularly when they were dealing with low-loss or high-threat events. They suggested that this means of coping is maladaptive when it is separated from the behavioral elements of active coping; that is, when it cannot be followed by action. "The fact that cognitive coping generally is a negative strategy suggests that this kind of coping pattern may occur most frequently in response to situations that cannot be changed; the inability to change a situation almost certainly would heighten its stressfulness." (p. 117).

Although subjects' perceived sense of control was not measured in this study, it would seem that the procedure of CC, with significant risks and a great deal at stake for the patient, provides little opportunity for direct action. As the demands of the situation decreased at PP5 and PP6, a positive shift in emotions occurred.

"Hoping" and "faith in others", used relatively infrequently throughout the CC procedure, were also positively correlated with the reported SUDS scores. "Hoping" was significantly correlated at PP1, PP2, and PP3, with positive but non-significant correlations continuing at PP5 and PP6. As this coping strategy was used most often at the beginning and the end of the procedure, it may be that those individuals who expressed hope were focusing on the risks inherent in the procedure or on obtaining the results of the CC, and were thus more anxious than others.

Correlations of "faith in others" with anxiety were significantly positive only at PP5, and otherwise fluctuated from positive to negative throughout the procedure. As only one individual reported using this strategy at PP5, the significance of this result is subject to question. During the post-CC interview, several patients reflected that the camaraderie and easy-going attitude of staff in the CC lab helped to put them at ease, but this is not reflected in the results.

The only two coping strategies which were significantly and negatively correlated with SUDS scores were "positive reframing" and "passive coping". "Positive reframing" was significant at PP4, as the patient experienced the warm sensation of the dye injection. Although non-significant negative correlations existed elsewhere, this strategy was rarely used during other procedural points. The positive effect experienced by subjects using "positive reframing" at PP4 is consistent with a review of the literature by Silver and Wortman (1980). In studies on coping with uncontrollable events, they found that those who discovered a positive side in a negative situation experienced less distress than those who did not.

"Passive coping", used primarily during the groin wash at PP1, was significantly and negatively correlated only at this point. Parkes (1984) found that use of suppression, defined as a tendency to cope by ignoring thoughts and feelings about the stressful situation, continuing as though nothing had happened, and not reporting distress to anyone, was negatively correlated with the perceived importance of the situation. This suggests the possibility that "passive coping" is a feasible response only to relatively minor stressors. Although negative correlations continued at PP2 and PP3, the weaker relationship may indicate that patients undergoing cardiac catheterizations were able to accommodate to the stressful feelings inherent at the first procedural point, but with the increasing demands of the next PP's, found it more difficult to successfully use this strategy. The change to a positive direction at PP5 may further reflect a reduced ability to cope with the uncertainty relating to procedural outcome.

"Relief focusing", "distraction", and "comparison of expectations" were not significantly correlated with SUDS scores at any procedural point during the CC. One might expect that those individuals who expressed relief that the situational demands had diminished or stopped would report less distress than others, but this was not reflected in the results. It may be that other subjects also experienced a sense of relief but did not actually report it during the interview, or that some overlap occurred between "relief focusing" and other strategies. For example, there may be a sense of relief inherent in thinking that the procedure was not as bad as expected, or in knowing that the staff had actually been as competent as believed.

From the literature review, it was expected that "distraction" would be associated with less procedural distress, but the distractors were not found to be significantly less anxious than those using other strategies. There is evidence that when a situation is perceived as uncontrollable, avoidance does serve to reduce anxiety (Roth & Cohen, 1986). However, in a review of studies, Miller (1980) found that stressors which impose a high degree of invasiveness adversely affect the use of distraction as a coping response.

Subjects who compared the experience in a neutral or positive direction to what they had expected likewise reported no less anxiety than others. Pearlin and Schooler (1978) found that people often cope successfully with life stressors by using positive comparisons, but although the relationships in this study were negative, they were non-significant during the CC procedure.

The Relationship between Spontaneous Coping Strategy Use and Anxiety at the Following Procedural Point

Question 2: Does the relationship between coping and anxiety extend beyond the specified point at which it is reported?

In order to find whether the relationship between coping strategy use and anxiety extended beyond the actual procedural point at which it was reported, correlations were done between the coping strategies at each PP and the SUDS scores at the following PP. Generally, the relationships, reported in Table 11, were similar to those observed between coping and anxiety at the same PP. There was a significant positive relationship between coping and anxiety when "control" or "hoping" were used at PP1 or PP2, and the SUDS scores were reported at PP2 or PP3 respectively. When patients used "passive coping" at PP1, the significant negative relationship with the SUDS rating found at PP1 extended to PP2. It was noted that, where no significant relationship between "passive coping" and anxiety occurred at PP5, patients using this strategy reported significantly greater anxiety at PP6. Subjects who reported using "faith in others" at PP4 and PP5 had significantly higher SUDS scores at PP5 and PP6 respectively.

With the exception of PP3 to PP4, and PP4 to PP5, whenever a significant correlation occurred between coping

Table 11

Correlations of SUDS Scores with Coping at Preceding Procedural Points

Coping at Preceding PP	PP2	PP3	PP4	PP5	PP6
Pos. Reframing	.04	--	-.09	-.21	-.10
Control	.26*	.30*	.11	-.04	-.11
Relief	.04	.17	.18	.05	-.10
Distraction	.03	-.17	-.06	-.01	--
Comparisons	.02	-.11	-.02	-.14	-.17
Faith in Others	.02	-.01	-.09	.33*	.38*
Passive Coping	-.39*	-.07	-.06	.16	.25*
Hoping	.23*	.31*	-.08	-.09	.13

*significant at p<.05
--coefficient could not be computed

and anxiety during a PP, this relationship extended to the reported anxiety at the next PP. These results may reflect the similarity of the initial three procedural points (getting prepared for the procedure), and of the final two (the procedure is complete), whereas at PP4, patients were fully aware that the cardiac catheterization was in progress. It may also reflect a longer time period elapsing, particularly between PP4 and PP5, whereas the initial three and the last two procedural points tend to occur in fairly quick succession.

The Difference between Versatile and Consistent Copers

Question 3: Is there a difference in anxiety between subjects who maintain coping strategy use and those who shift coping strategies throughout the cardiac catheterization procedure?

Patients who used a consistent coping style, that is, those who reported using the same coping strategy at three or more consecutive procedural points, were compared with those who used a versatile style of coping. By calculating the point biserial correlation of coping style with the procedural SUDS score (the mean of SUDS scores at all six PP's), it was found that versatile copers reported significantly less procedural anxiety than consistent copers (r=.24; p=.05). When subjects were grouped according to whether or not they had used the same coping strategy at three or more non-consecutive procedural points, a non-significant relationship occurred (r=.20; p=.10). Thus those who used the same strategy a number of times, but interspersed it with other strategies experienced slightly less distress than those who used the same strategy at consecutive procedural points. Similar findings were observed by Mattlin et al. (1990), who found that versatile coping, whereby subjects used virtually all of six identified coping strategies to manage their problems, was associated with positive emotional adjustment.

CHAPTER VI

SUMMARY, CONCLUSIONS AND IMPLICATIONS

This study involved the development of the Coping with Invasive Medical Procedures Scoring System. The System was used to categorize the reported coping responses of patients as they progressed through the cardiac catheterization procedure. The scored strategies were then correlated with patient anxiety and demographic variables, and the relationships as they occurred throughout the procedure were described.

A brief summary of the study results is presented, followed by a critical discussion of both the method of obtaining coping responses and the scoring system. This chapter concludes with the implications of this study for coping research, patient teaching, and future study.

Summary

Three research questions were posed in this study: 1) What is the relationship between spontaneous coping strategy use and anxiety at specified points during the cardiac catheterization procedure? 2) Does this relationship extend beyond the specified points at which it is reported? 3) Is there a difference in anxiety between subjects who maintain coping strategy use and those who shift coping strategies throughout the cardiac catheterization procedure?

It was found, using the Coping with Invasive Medical Procedures Scoring System, that a significant relationship did exist between coping and anxiety variables, and that this relationship fluctuated throughout the course of the procedure. Use of "control" and "hoping" as coping strategies were related to high anxiety during the first three procedural points. "Faith in staff" was also related to high anxiety at PP5, but this result was based on strategy use by only one individual. Strategies associated with low anxiety were "passive coping" at PP1 and "positive reframing" at PP4.

The relationships between coping and anxiety occurring at one procedural point generally persisted to the next procedural point. The exception was when PP4 was involved. Specifically, if there had been a significant relationship reported at PP3, it did not continue when coping at PP3 was correlated with anxiety at PP4. Similarly, in one instance the relationship was non-significant at PP4, but significant when the coping strategy was correlated with anxiety at PP5.

The patients' style of coping during the cardiac catheterization procedure was found to be significantly related to anxiety. Versatile copers, who shifted from one coping strategy to another, experienced less procedural anxiety than those who reported a more consistent coping approach.

Conclusions

The accuracy of the obtained results is a function of two primary factors: 1) the method by which the coping data was obtained, and 2) the scoring system which was used to categorize the data. The influence of each of these factors is discussed.

Method of Obtaining Data

Coping data was obtained by asking patients, following the cardiac catheterization procedure, to report how they had managed the perceived situational demands at each of six procedural points. Patients may have had difficulty with this method for several reasons. For those unaccustomed to discussing feelings and fears, there may have been a hesitation to reveal how they coped, particularly as coping strategies were elicited immediately following questions about procedural concerns. Others may have been willing to discuss coping, but lacking conscious awareness of strategy use, could not completely relay their coping methods to the research assistant. Similarly, while recollecting the information, patients may have forgotten that particular strategies were used. For those patients, prompting with direct questions about specific strategy use may have resulted in a greater number being reported.

When and how patients were asked about their coping strategies may also have influenced their responses. Three research assistants were involved in obtaining the data for the larger study, and their interviewing techniques and strategies may have affected the quality of the data. Open-ended questions such as "How did you manage to keep your anxiety down while you were getting the freezing?" tended to generate more coping information than a closed question such as "Did you try to keep your mind off of the freezing?". In some of the transcripts, coping data was missing at one or more procedural points as the patients had not been asked about their coping efforts.

The alternative to obtaining unstructured data would have been to use a checklist from which patients could choose the coping strategies which they used. This was not practical as an appropriate tool for measuring spontaneous coping during invasive medical procedures has not been developed. Coping scales with established reliability and validity do exist (Jalowiec, 1979; Lazarus & Folkman, 1984; Billings & Moos, 1981), but they describe a broad range of behavioral and cognitive coping strategies that an individual might use in a variety of situations. Consequently, many of the strategies are not suitable for use during an invasive medical procedure; for example, eating or sleeping behaviors, talking with others about the problem, avoiding others, setting goals, and trying harder to make things work are unlikely strategies during CC.

Furthermore, the number of items on these established inventories, ranging from 33 to 68, negate their use as process measures of coping; for this study, it would have been impractical for patients to complete such a measure six different times.

Although there were inherent difficulties in obtaining coping strategy data through an unstructured interview, it would seem the best available method. For each patient, the full range of coping strategies may not have been reported at each procedural point, but those that were appear to reflect the actual coping used rather than the closest response from what was available on a checklist. As the obtained data is totally from the patient's perspective, it is believed to be a more accurate representation of actual coping than if a previously developed scale had been used.

The Scoring System

The content validity of the CIMP Scoring System was substantiated by the method in which it was developed; that is, it was developed from actual patient reports of their coping efforts during the CC procedure. The Scoring System was reflective of the broad range of coping strategies identified in the literature, and in this study, it was comprehensive enough to categorize every coping response in the raw data.

The Scoring System met theoretical criteria of coping as a construct because it was developed from patient reports of their efforts to manage situational demands. It could be argued that if strategies such as "control" are consistently associated with high anxiety, they cannot truly be coping strategies. However, the effectiveness of coping cannot be judged in such a correlational investigation. In relation to causation and the direction of influence, it is likely that anxiety can influence the selective use of coping strategies, as well as the reverse. Furthermore, a favorable outcome exists, according to the cognitive theory of emotions, when an individual feels that situational demands were managed as well as could be expected. Although not asked, subjects in this study may have learned through previous experience that strategies such as "control" work best for them, and they may well have been satisfied with the outcome of their coping efforts during the CC procedure.

Construct validity through comparison of this instrument with others was not feasible. However, the results of correlations between coping and anxiety variables are generally in agreement with those obtained in previous studies of spontaneous coping efforts. Specifically, strategies such as "control" and "hoping", in which attention was focused toward the stressor or the individual's reaction to it, were associated with higher anxiety than those in which the focus was away from the stressor.

The actual coping categories may be revised with further use of the scoring system. For example, "hoping" and "control", which were defined as separate constructs in this study, are similar categories which may be combined. Both involve cognitive activity directed toward the stressor but, whereas there is an attempt to influence the results of an event by using "control", no such attempt is made during "hoping". Whether this difference in cognitive activity justifies classification as separate coping strategies, or whether "hoping" is more accurately defined as a subcategory of "control", is unknown. The high correlations between the two strategies in the LPA confusion matrix, and the similarity of their relationships with anxiety, would suggest that the latter may be true.

A reasonable degree of inter-rater reliability was obtained when coping responses were scored, suggesting that others can be trained to successfully use this Scoring System. However, attention must be directed to the fact that the second rater in this study was the researcher's thesis supervisor, an individual with an in-depth understanding of the coping construct. As such, it is unknown how other raters would fare using the system.

One of the difficulties in obtaining agreement between raters is that, with unstructured coping data, each coping response may include more that one coping strategy. Thus, if raters agree that a particular strategy is used in the response, but one of the raters misses that a second strategy was also used, the reliability drops to 50 per cent. In this study, the second rater received only randomly drawn responses to do reliability checks. If she had been able to review all of the procedural point responses, as recommended in the Scoring Rules, reliability may have improved.

Implications

Notwithstanding the difficulties that may exist with the methods of obtaining and scoring coping responses, the implications of this study for both researchers and clinicians are outlined. First, the results of this study are discussed in relation to the findings obtained in previous studies of spontaneous coping in the clinical setting. Second, suggestions for using the CIMP Scoring System in further coping research are made. Third, recommendations for patient teaching, incorporating the results of this study, are proposed.

Support of Previous Research Findings

Knowledge about spontaneous coping during invasive medical procedures has been based on the findings of three studies done during blood and dental procedures (Kaloupek et al., 1984; Kaloupek & Stoupakis, 1985; Wong & Kaloupek, 1986). Whether or not the results of these studies can be generalized to patients undergoing CC is, at this time, somewhat speculative. The CC procedure was of a longer duration, involved greater risks to the patients, and was more invasive in nature than blood donation or dental procedures. Further, the CC patients were older and were undergoing the procedure for the first time. Nevertheless, several similarities in the results were observed.

The "control" category in this research was comprised of similar strategies to those identified by the previous researchers as the behavioral method (trying to find out more about the situation; trying to relax) and an emotion focus (attempting to recognize or manage emotional consequences of stressors). In all studies, when significant results occurred using "control", the behavioral method, or an emotion focus, patients reported greater anxiety than those using other coping strategies.

Whereas the avoidant method of coping was found to be most consistently related to reduced anxiety in previous studies, the "distractors" in this study were not significantly less anxious than others. One reason for the difference in the results relates to the strategies which comprise the compared categories. The avoidant method consisted of distraction strategies as well as denial of a negative physical or emotional state. Given that those who denied a stressful state would have been categorized as "passive copers" in this study, and that they did experience significantly less anxiety at the beginning of the CC procedure, the results of this study more closely resemble previous findings. A second reason why this difference may have occurred relates to the stressfulness of the procedure itself. Kaloupek & Stoupakis (1985) found that first time blood donors experienced greater anxiety and made less use of avoidance methods than returning donors. Although avoidant coping strategies may reduce anxiety, they suggested that low levels of anxiety could be necessary for avoidance strategies to be used. The interference of high anxiety levels with successful use of distraction would account for the absence of significant findings in patients using that strategy during the stressful CC procedure.

Despite the diversity between the invasive medical procedures studied, similar study findings suggest that the results may generalize to other invasive medical procedures. However, it is important to note that high procedural anxiety, particularly among patients undergoing a procedure for the first time, may adversely affect the use of some coping strategies.

Use of the CIMP Scoring System

The CIMP Scoring System proved to be a satisfactory method of categorizing spontaneous coping responses reported by patients who were undergoing cardiac catheterization. Because the Scoring System is comprehensive and developed from actual patient responses, it is likely that it could be used in the study of coping during other invasive medical procedures as well.

If the Scoring System is used in other studies, further sub-categories may evolve, making it possible to determine whether differences exist within, as well as between categories. As the categories become more refined, a coping checklist could be developed, thereby providing a more practical and time-efficient method of data collection.

The CIMP Scoring System was developed to categorize spontaneous coping strategies, but it could also be used to determine the coping strategies used by patients who were trained pre-procedurally in a coping skills intervention. Given that control subjects often use spontaneous coping strategies, and that trained subjects may use strategies different from those which they were taught (Berntzan, 1987; Frenn et al, 1986), it would be useful to ask subjects post-treatment how they had actually coped.

The CIMP Scoring System could also be used as a guide in determining patients' usual styles of coping; that is, finding out which coping strategies they tend to use during stressful life events. It could then be determined whether the coping strategies used during an invasive medical procedure are similar to, or discordant from, those normally used, and how discrepancies between strategy use and coping style relate to emotional distress. Knowing whether patients use the coping skills in which they are trained, and whether the strategies which they use during an invasive medical procedure resemble their usual style, will certainly have implications for teaching coping skills in the future.

Implications for Patient Teaching

Although it would be premature to implement coping skills training based on the results of a correlational study, some tentative recommendations for patient teaching are proposed. Because trained coping skills which reinforce the patient's preferred strategies have generally been successful (Kendall et al., 1979; Brown, 1984; Martelli et al., 1987), reinforcement of coping strategies based on this investigation are discussed.

It has been suggested that active cognitive coping is maladaptive when it is separated from the behavioral elements of active coping (Mattlin et al., 1990). For patients who typically use "control" strategies, it may therefore be beneficial to teach behavioral strategies which would enhance their sense of control. For example, before the procedure of CC begins, patients could ask staff about it or inform them of their concerns. During the injection of local anaesthetic and insertion of the introducer, they could attempt to relax the muscles of their leg, thereby facilitating these events. Patients could also be asked to inform staff of anything unusual in order to foster a sense of ongoing involvement during the CC. These suggestions would also apply to patients who use "hoping" as a coping strategy. Because it involves similar cognitive activity to "control", adding a behavioral component may aid in coping.

Given that "passive coping" was associated with low anxiety only at the groin wash, patients who use this strategy may need to develop alternative strategies as the demands of the situation increase. As "passive copers" tend not to focus on the demands of the situation, "distraction" or helping to instill "faith in others" may be compatible coping strategies to recommend. For example, if, after learning about the CC procedure and its associated risks, a patient said that he really saw nothing to be concerned about, the nurse might reinforce coping by saying, "Yes, the staff in the cath lab are excellent. They do several CC's every day and really know what they are doing."

"Positive reframing" is an ideal strategy to use when discussing the warm sensation associated with the dye injection. Whereas staff most often refer to it as "the hot flush" or "the hot shot", they could tell patients that it is a very warm feeling throughout the body, much like having a shower or sunbathing. Even without "positive reframing", it would seem that reference to a warm, rather than a hot sensation, would be less distressing for patients.

Finding that versatile copers experienced significantly less anxiety than consistent copers indicates that it may be preferable for patients to use a variety of coping strategies throughout a procedure. Furthermore, because significant relationships between coping and anxiety extended only between PP1 and PP2, PP2 and PP3, and PP5 and PP6, maximal coping effectiveness may be facilitated by recommending that different strategies be used before, during, and after the dye injection at PP4.

Future Research

In this study, a great deal of variability occurred in the spontaneous coping efforts of patients. In order to understand these variations in coping, the issues of coping style and situational appraisal need to be addressed.

Whether stable coping styles exist or whether coping is a dynamic process which shifts during and between stressful situations is controversial (Carver, Scheier & Weintraub, 1989), but the outcome of this debate will undoubtably impact on the types of coping interventions which health care professionals provide. If a stable style exists, it may be counterproductive to teach patients coping strategies discrepant from their usual methods, whereas if coping fluctuates throughout and between situational stressors, it would likely be advantageous to encourage those strategies which are associated with low anxiety during a stressful procedure.

How a patient appraises a stressful situation will also influence coping efforts (Folkman, Lazarus, Dunkel-Schetter & Gruen, 1986). For some patients in this study, the cardiac catheterization procedure was judged to be a life-threatening event; for others, it was merely a diagnostic procedure entailing minimal risk and discomfort. Paterson & Neufeld (1978) propose that a number of factors are implicated in determining one's cognitive appraisal of an event: the extent to which a goal is threatened, the severity of the threat, the imminence of the stressor, the anticipatory time before the stressor occurs, and the probability of a specified event's occurrence.

An understanding of the nature of appraisal, and the influence of individual coping styles on appraisal and coping responses, will help explain the differences which have been found in the coping responses of patients. A model which can explain the relationship between these variables will assist health care professionals to determine the most suitable method of enhancing coping skills.

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Appendix A

UNIVERSITY OF ALBERTA HOSPITALS
EDMONTON, ALBERTA

Informed Consent for the Research Study Titled:

PREPARATION OF ADULT PATIENTS FOR CARDIAC CATHETERIZATION

RESEARCHERS WHO ARE DOING THIS STUDY ARE:

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PURPOSE OF THE STUDY

Patients who are hospitalized for cardiac catheterization usually experience varying degrees of anxiety while awaiting their catheterization. In order to minimize or remove such fears, nursing staff provide cardiac catheterization patients with information about what to expect before, during and after their catheterization procedure. Unfortunately, it is not known which way of providing such information works best.

We will be studying the effectiveness of three different methods of providing cardiac catheterization patients with information about the catheterization procedure. We will be determining which method works best by taking into account how each catheterization patient deals with information about stressful events. Put in more scientific language, we will be determining which method is best by assessing each patient's "cognitive coping style".

VOLUNTARY PARTICIPATION

We would like you to assist us by participating in the study. We also want you to know that you do not have to be in this study if you don't want to participate in it. If you do decide to participate in the study you can drop out at any time just by telling your nurse or one of the researchers that you wish to withdraw. No one will hold it against you if you decide to drop out. Your care during your hospital stay won't change because you are or aren't in this study.

We want you to know, too, that your doctor knows about our study and has given his permission for you to participate in it if you wish.

STUDY PROCEDURE

The three patient information methods to be evaluated in this study are:

(1) Method "A" is the information method currently used on the unit. It involves having the patient read a 35 page booklet which provides easy to read step-by-step information on the cardiac catheterization procedure.

(2) Method "B" has been developed by the researchers. It involves having the patient view a short videotape which provides step-by-step information about the catheterization procedure while showing a male (or female) patient before, during and after his/her catheterization procedure in this hospital.

(3) Method "C" has also been developed by the researchers. This method is the same as Method "B" except that this videotape also includes information about the sensations patients commonly experience before, during and after their catheterization procedure.

Patients who participate in this study will be randomly assigned (like a lottery) to receive information about cardiac catheterization by means of one of these three methods.

This study will be conducted before, during and after the patient's cardiac catheterization procedure. If you agree to participate in this study you will be one of 150 patients who fulfill the nine steps described on the next two pages. If you decide not to participate in the study you will not fulfill the nine steps described on the next two pages, but you will receive information about cardiac catheterization by means of the information booklet (Method A).

The afternoon or evening BEFORE your catheterization you would:

Step 1. complete three questionnaires designed to measure your anxiety level and cognitive coping style and have your pulse and blood pressure taken

Step 2. read the patient information booklet (Method A) or observe one of the 20 minute information videotapes (Method B or C)

Step 3. complete one questionnaire designed to measure your anxiety level and have your pulse and blood pressure taken

The DAY of your catheterization before leaving your hospital room for your catheterization you would:

Step 4. complete one questionnaire designed to measure your anxiety level and have your pulse and blood pressure taken

DURING your catheterization you would:

Step 5. when asked by the nurse-researcher, tell her what your anxiety number is using a 10 point scale where the number 0 represents no anxiety and the number 10 represents the most anxiety you have ever experienced. (Note: the nurse-researcher will ask for your anxiety number at 6 different times during your catheterization procedure)

Step 6. tell the nurse-researcher your anxiety number if you notice it increasing (going up)

Step 7. tell the nurse-researcher your anxiety number if you notice it decreasing (going down).

Please note: every time the nurse-researcher records your anxiety number she will take your pulse and blood pressure.

Immediately FOLLOWING your catheterization you would:

Step 8. participate in a 20-30 minute tape recorded interview conducted by the nurse-researcher who was with you before and during your catheterization procedure (this interview will focus on what you experienced during your catheterization and what you were thinking when your numbers went up, down, and/or remained the same).

The day of your catheterization while RECOVERING from your catheterization in your hospital room you would:

Step 9. complete a questionnaire designed to measure your anxiety level and have your pulse and blood pressure taken.

CONFIDENTIALITY

If you participate in this study your name and what you say and do will be kept confidential. Your questionnaires and records will not be marked with your name but only with a number to preserve your anonymity. The audiotapes from the tape-recorded interview will be erased once the transcript is made and the transcript will be coded with a number. Your doctors and nurses in the hospital will not see or hear about your personal records from this study, unless you, yourself, wish to speak to them about your experiences. If your personal records are used to answer research questions that are different from the ones talked about in this consent, the researchers will get ethical approval according to usual University procedure before beginning such research.

When the results of the study are completed, we plan to publish our results in scientific journals and to present our findings to health care professionals. We want you to know that when we do so we will not identify you in our talks or writing.

A member of our research team will be happy to answer any questions you have now. If you have questions later, you can contact one of the researchers listed on the first page.

PARTICIPANT'S STATEMENT:

I have read this information and give my consent to be involved in the study "Preparation of Adult Patients for Cardiac Catheterization".

______________________________ ______________________
signature of participant date

______________________________ ______________________
signature of research assistant date

I also give permission for the researchers to contact me in the future to ask me if I would be willing to be part of another study.
Yes ________ No ________

____
signature of participant

____

____
address

Appendix B

Grouping of Coping Responses into Latent Partitions through Wiley's Latent Partition Analysis

Partition #1

I thought, I'm so lucky to be here and have this done...

something I've never experienced before. I really enjoyed it. Gosh sakes, I never had any pain and I could see the pictures. I wouldn't mind going through it again.

The hot flash of the dye felt like I was laying on a beach in Hawaii. I love the heat. It was like laying in the sun.

I felt that heat going through me, and then I just calmed down. It was kind of a thrill.

Partition #2

I was telling myself how stupid it was to even be worried about a little needle that doesn't hurt much anyway. It's not going to be any worse than the dentist's needle.

When I get pain, I just grit my teeth and tense up. I think that it's not going to last very long, and in a second or two it will be gone and I can relax.

Partition #3

I was relieved that it was over and it seems like everything is alright. Nothing went wrong. There's really no after-effect, as far as I know.

When the doctor said it was nearly over, I knew that a stroke wasn't going to happen again and that from there I was home free.

Somebody mentioned that it was just about done, so I knew the procedure was almost over.

I was relieved that it was over and everything was alright.

I realized it was getting near the end and everything was okay.

Partition #4

I was trying to guage my body physically as well as mentally.

I knew it was going to hurt a bit and I was trying to be normal and to relax.

I was doing my breathing exercise and was consciously trying to will myself still and relax.

I was trying to keep my mind off of it by looking around at everything.

I settled myself down by taking my mind off of it completely. I was thinking about higher thoughts... meditating.

Partition #5

I was distracted by all the stuff, and quite comfortable.

I kept calm because I was talking and the staff were distracting me.

I was thinking that it was going to feel good to have a cigarette later.

I was thinking about the big Lincoln I'm going to buy. I want a black one.

I was thinking about home and my grandchildren. Trying to distract myself from getting the needle.

Partition #6

I think if I hadn't been warned about it, the dye injection would have bothered me more, but the nurse told me that it was going to happen, and I was aware.

I was warned that it would feel how, so I expected it... knowing what's going to happen makes it easier.

After watching the video about the procedure, I knew what was going to happen. The dye was exactly what I anticipated would happen.

The hot flash didn't bother me because I was expecting it. It wasn't as bad as going through menopausal hot flashes.

Partition #7

I was listening to the doctor. She kept saying that everything looked okay. Everytime she told me the results, it made me feel better.

Everybody locked like they knew what they were doing, so I just quit worrying about it.

I'm sure the staff are trying their best and know what they're doing. My life is in their hands.

I had complete faith in the people who were working with me. I tell myself not to be foolish because of course these people know exactly what they're doing.

The doctor said it would be okay, so I just thought it would be okay.

I've gone through these kinds of things so often that I have confidence in the doctors.

I knew I was being taken care of by experts.

Partition #8

It didn't bother me because I think back to previous experiences and prepare myself for almost anything. It never is as bad as I think it's going to be. I set my negative attitudes a little high so that I'm prepared and pleased.

After that first heat rush, I relaxed. I thought, if that's the worst it's going to be, then there's no problem.

I was surprised that it was so simple.

I was waiting for the pain of it, but there never was any. The freezing must have worked.

After having quite a few growths removed, I figured the freezing would sting like murder. But this wasn't bad. The big sting never happened.

I thought it would be a lot worse, that I'd feel everything. I only felt the hot flush in my chest. It was only a matter of ten seconds and it was over. I really didn't have time to think about it.

Well, I thought the hot flush would be warmer, and it wasn't.

I was surprised that they had the catheter in there with so little pain or effort. There seemed to be less pain and problems than I had expected.

Partition #9

I just took everything in stride.

I was relaxed. What happens, happens. I wasn't going to worry about it.

The procedure had to be done. There's no point in worrying about it.

I just lay there and let them do what they had to do.

Partition #10

I wasn't thinking a damn thing. In fact, I was happy that it was done.

I didn't feel a thing. I don't recall thinking about anything. My mind was a blank, peaceful.

I wasn't really thinking of anything. I was just waiting for the procedure to go on.

Partition #11

The pressure feeling was nothing, really. I can't say I was thinking of anything because I was paying attention to what was going on. I was listening and watching.

I was trying to see what was going on, see what the procedure was.

Partition #12

I was hoping that the procedure would come out good.

I was hoping that it wouldn't get any worse.

Appendix C

Table C-1

Correlations of SUDS Scores with Duration at each Procedural Point

	PP1	PP2	PP3	PP4	PP5	PP6
Duration	.02	-.00	-.04	.20	.26*	.15

*significant at p<.05

Table C-2

Correlations of Age with Coping Strategy Use at each Procedural Point

	PP1	PP2	PP3	PP4	PP5	PP6
Pos. Reframing	.12	--	.09	.06	.34*	.22
Control	.04	.05	-.25*	.13	.06	.04
Relief	-.25*	.14	-.04	-.15	-.11	-.21
Distraction	-.34*	-.11	-.12	-.21	--	--
Comparison	.15	.15	.06	.09	-.01	-.28*
Faith in Others	.01	.27*	-.08	.08	-.21	.13
Passive Coping	.28*	-.07	.18	-.09	.01	.17
Hoping	-.18	.12	.13	.13	-.12	.06

* significant at p<.05
-- coefficient could not be computed

Appendix D

Table D-1

Correlations of Duration of CC Procedure with Coping Strategy Use at each Procedural Point

	PP1	PP2	PP3	PP4	PP5	PP6
Pos. Reframing	.16	--	-.10	-.17	.04	.16
Control	-.18	-.10	-.21	.06	-.16	.12
Relief	-.07	-.09	.31*	-.05	-.15	.08
Distraction	-.07	.02	.04	.01	--	--
Comparison	.02	.19	.23	.21	.11	.01
Faith in Others	-.26*	.18	-.01	.29*	-.05	-.16
Passive Coping	.33*	-.08	-.10	-.01	.23*	-.07
Hoping	-.08	-.03	-.16	.02	.18	.06

* significant at p<.05
-- coefficient could not be computed